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JC575 U.S. PTO

UTILITY PATENT APPLICATION TRANSMITTAL
(Large Entity)*(Only for new nonprovisional applications under 37 CFR 1.53(b))*Docket No.
SWR-0032

Total Pages in this Submission

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TO THE ASSISTANT COMMISSIONER FOR PATENTSBox Patent Application
Washington, D.C. 20231

Transmitted herewith for filing under 35 U.S.C. 111(a) and 37 C.F.R. 1.53(b) is a new utility patent application for an invention entitled:

EVAPORATOR

and invented by:

DIPL.-ING. KLAUS NIEPOTH, ET AL.If a **CONTINUATION APPLICATION**, check appropriate box and supply the requisite information:☐ Continuation ☐ Divisional ☐ Continuation-in-part (CIP) of prior application No.: _____

Which is a:

☐ Continuation ☐ Divisional ☐ Continuation-in-part (CIP) of prior application No.: _____

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Enclosed are:

Application Elements

1. ☒ Filing fee as calculated and transmitted as described below
2. ☒ Specification having 7 pages and including the following:
 - a. ☒ Descriptive Title of the Invention
 - b. ☐ Cross References to Related Applications *(if applicable)*
 - c. ☐ Statement Regarding Federally-sponsored Research/Development *(if applicable)*
 - d. ☐ Reference to Microfiche Appendix *(if applicable)*
 - e. ☒ Background of the Invention
 - f. ☒ Brief Summary of the Invention
 - g. ☒ Brief Description of the Drawings *(if drawings filed)*
 - h. ☒ Detailed Description
 - i. ☒ Claim(s) as Classified Below
 - j. ☒ Abstract of the Disclosure

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Application Elements (Continued)

3. ☒ Drawing(s) (when necessary as prescribed by 35 USC 113)
- a. ☐ Formal Number of Sheets _____
- b. ☒ Informal Number of Sheets 1
4. ☐ Oath or Declaration
- a. ☐ Newly executed (original or copy) ☐ Unexecuted
- b. ☐ Copy from a prior application (37 CFR 1.63(d)) (for continuation/divisional application only)
- c. ☐ With Power of Attorney ☐ Without Power of Attorney
- d. ☐ DELETION OF INVENTOR(S)
Signed statement attached deleting inventor(s) named in the prior application,
see 37 C.F.R. 1.63(d)(2) and 1.33(b).
5. ☐ Incorporation By Reference (usable if Box 4b is checked)
The entire disclosure of the prior application, from which a copy of the oath or declaration is supplied under
Box 4b, is considered as being part of the disclosure of the accompanying application and is hereby
incorporated by reference therein.
6. ☐ Computer Program in Microfiche (Appendix)
7. ☐ Nucleotide and/or Amino Acid Sequence Submission (if applicable, all must be included)
- a. ☐ Paper Copy
- b. ☐ Computer Readable Copy (identical to computer copy)
- c. ☐ Statement Verifying Identical Paper and Computer Readable Copy

Accompanying Application Parts

8. ☐ Assignment Papers (cover sheet & document(s))
9. ☐ 37 CFR 3.73(B) Statement (when there is an assignee)
10. ☐ English Translation Document (if applicable)
11. ☒ Information Disclosure Statement/PTO-1449 ☒ Copies of IDS Citations
12. ☒ Preliminary Amendment
13. ☒ Acknowledgment postcard
14. ☒ Certificate of Mailing

☐ First Class ☒ Express Mail (Specify Label No.): EL540189816US

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Total Pages in this Submission

Accompanying Application Parts (Continued)

15. ☐ Certified Copy of Priority Document(s) *(if foreign priority is claimed)*

16. ☐ Additional Enclosures *(please identify below):*

Request That Application Not Be Published Pursuant To 35 U.S.C. 122(b)(2)

17. ☐ Pursuant to 35 U.S.C. 122(b)(2), Applicant hereby requests that this patent application not be published pursuant to 35 U.S.C. 122(b)(1). Applicant hereby certifies that the invention disclosed in this application has not and will not be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication of applications 18 months after filing of the application.

Warning

An applicant who makes a request not to publish, but who subsequently files in a foreign country or under a multilateral international agreement specified in 35 U.S.C. 122(b)(2)(B)(i), must notify the Director of such filing not later than 45 days after the date of the filing of such foreign or international application. A failure of the applicant to provide such notice within the prescribed period shall result in the application being regarded as abandoned, unless it is shown to the satisfaction of the Director that the delay in submitting the notice was unintentional.

UTILITY PATENT APPLICATION TRANSMITTAL
(Large Entity)

(Only for new nonprovisional applications under 37 CFR 1.53(b))

Docket No.
SWR-0032

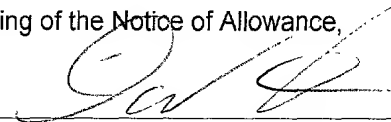
Total Pages in this Submission

Fee Calculation and Transmittal

CLAIMS AS FILED

For	#Filed	#Allowed	#Extra	Rate	Fee
Total Claims	5	- 20 =	0	x \$18.00	\$0.00
Indep. Claims	1	- 3 =	0	x \$80.00	\$0.00
Multiple Dependent Claims (check if applicable) <input type="checkbox"/>					\$0.00
BASIC FEE					\$710.00
OTHER FEE (specify purpose) _____					\$0.00
TOTAL FILING FEE					\$710.00

- ☒ A check in the amount of **\$710.00** to cover the filing fee is enclosed.
- ☒ The Commissioner is hereby authorized to charge and credit Deposit Account No. **06-1130** as described below. A duplicate copy of this sheet is enclosed.
- ☐ Charge the amount of _____ as filing fee.
- ☒ Credit any overpayment.
- ☒ Charge any additional filing fees required under 37 C.F.R. 1.16 and 1.17.
- ☐ Charge the issue fee set in 37 C.F.R. 1.18 at the mailing of the Notice of Allowance, pursuant to 37 C.F.R. 1.311(b).


Signature

Dated: November 6, 2000



PATENT TRADEMARK OFFICE

David A. Fox
Reg. No. 38,807
Customer No. 23413
Tel. No. 860-286-2626

CC:

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

IN RE APPLICATION OF: DIPL.-ING. KLAUS NIEPOTH, ET AL.

FOR: EVAPORATOR

PRELIMINARY AMENDMENT

Box Patent Application
The Assistant Commissioner of
Patents and Trademarks
Washington, DC 02031

Sir:

Prior to the Examiner acting in the above-referenced application, please
preliminary amend the claims as follows:

IN THE SPECIFICATION:

Page 1, between lines 4 and 5, please insert - -TECHNICAL FIELD- -.

Page 1, between lines 10 and 11, please insert - -BACKGROUND OF THE
INVENTION- -.

Page 1, between lines 23 and 24, please insert - -SUMMARY OF THE
INVENTION- -.

Page 2, between lines 20 and 21, please insert - -BRIEF DESCRIPTION OF THE
DRAWINGS- -.

Page 2, between lines 29 and 30, please insert - -DETAILED DESCRIPTION OF
TE PREFERRED EMBODIMENT- -.

"Express Mail" mailing label number EL540189
Date of Deposit November 16, 2000 8/16/00

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D.C. 20231.

Jennifer Matson
(Typed or printed name of person mailing paper or fee)

Jennifer Matson
(Signature of person mailing paper or fee)

Page 5, please delete in its entirety.

Page 6, please delete "Patent Claims" and insert - -PATENT CLAIMS- -.

Page 7, please delete "Abstract" and insert - -ABSTRACT- -.

IN THE ABSTRACT:

Please amend the Abstract as follows:

The invention concerns an evaporator, especially for the sugar industry, with at least two heat exchangers [(4, 5)], into the top of which the medium [(M)] to be concentrated is loaded and which are heated with steam [(D1, D2)] with different compositions and/or different pressures in a cross stream, wherein the concentrated medium and the exhaust steam generated, after they come out of the heat exchanger [(4, 5)], are carried off separately. To produce an evaporator that is simple and inexpensive in design, the invention proposes that the medium [(M)] to be concentrated be loaded by a medium distribution [(7)] common to all heat exchangers [(4, 5)] and the medium leaving the first heat exchanger [(4)] go directly into the next heat exchanger [(5)]. Only after the medium comes out of the second heat exchanger [(5)] are the exhaust steam and the medium separated. The steam spaces [(12, 18)] in the heat exchanger [(4, 5)] separated from the exhaust steam space [(8)] are separated from one another by a common dividing wall [(19)].

IN THE CLAIMS:

Claim 1. (Amended) An evaporator[, especially for the sugar industry,] with at least two heat exchangers [(4, 5)], into the top of which the medium [(M)] to be concentrated is loaded and which are heated with steam [(D1, D2)] with different compositions and different pressures in a cross stream, wherein the concentrated medium and the exhaust steam generated after coming out of the heat exchangers [(4,5)] are carried off separately, [characterized by the fact that] wherein the medium being concentrated [(M)] is loaded by a medium distribution [(7)] common to [all] the heat exchangers [(4,5)] and [by the fact that] wherein the medium [(M)] leaving the first heat exchanger [(4)] goes directly into the [next] second heat exchanger [(5)], [by the fact that] wherein only after the medium [(M)] comes out of the second heat exchanger [(5)] are the exhaust steam and the medium [(M)] separated and [by the fact that] wherein the steam spaces [(12, 18)] in the heat exchangers [(4, 5)] separated from the exhaust steam space [(8)] are separated from one another by a common dividing wall [(19)].

Claim 2. (Amended) The evaporator in Claim 1, [characterized by the fact that] wherein the condensate from the heat exchangers [(4, 5)] is carried away in separate pipes.

Claim 3. (Amended) The evaporator in Claim 1, [or 2, characterized by the fact that] wherein the heat exchangers [(4, 5)] are made of different materials.

Claim 4. (Amended) The evaporator in Claim[s] 1, [to 3, characterized by the fact that] wherein the first heat exchanger [(4)] is heated with exhaust steam [from a steam dryer for pulp] and the second heat exchanger [(5)] with turbine steam [from a power plant, for example].

Please add the following newly added claim:

Claim 5. (Newly Added) The evaporator in Claim 4, wherein the exhaust steam is from a steam dryer for pulp and wherein the turbine steam is from a power plant.

REMARKS

Applicants request entry of the above-identified amendments which, in part, reduce multiple dependencies and conform the claims to U.S. practice. No new matter is being introduced by this Amendment as antecedent support is set forth in the specification and the original claims.

Prosecution on the merits is respectfully requested.

If there are any charges with respect to this Amendment or otherwise, please charge them to Deposit Account No. 06-1130 maintained by Applicants' attorneys.

Respectfully submitted,

DIPL.-ING. KLAUS NIEPOTH, ET AL.

CANTOR COLBURN LLP
Applicants' Attorney

By: 

David A. Fox
Registration No. 38,807
Customer No. 23413

Date: November 6, 2000

Evaporator

5 The invention concerns an evaporator intended especially for the sugar industry, with at least two heat exchangers, into the top of which the medium being concentrated is loaded and which are heated with steam with different compositions and/or different pressures in a cross stream, wherein the concentrated medium and the exhaust steam generated is carried away from the heat exchanger separately after it comes out.

10 These types of heat exchangers are known from EP 0 729 772 A2. Two heat exchangers are arranged one on top of the other in a common cylindrical housing, and they each have their own medium distribution and their own catch basin for the concentrated product. One heat exchanger is heated with hot steam, which comes from a steam turbine, as
15 drawn off steam for example. The exhaust steam generated in the first heat exchanger are then used as a heating medium for the second heat exchanger. The product caught in the catch basin of the top heat exchanger is fed to the medium distributor of the next heat exchanger via a measurement and control device arranged laterally outside the housing.

20 The problem of the invention is to create an evaporator which is simpler and less expensive in design and with which the heat exchanger can be heated with different steam.

25 The invention's solution to this problem is characterized by the fact that the medium being concentrated is loaded by a media distribution common to all heat exchangers, and the medium that left the first heat exchanger goes directly into the next heat exchanger, by the fact that the exhaust steam and the medium are not separated until after the medium comes out of the second heat exchanger and by the fact that the steam spaces in the heat exchanger separated from the exhaust steam space are separated from one
30 another by a common dividing wall.

With the evaporator design in the invention, despite the presence of at least two heat exchangers, only one medium distribution is needed. The medium being concentrated flows through the heat exchanger by gravity and is drawn off out of the bottom part of the evaporator. Each individual heat exchanger can be heated independently with steam despite the formation of one structural unit, so that steam with different compositions and/or different pressures can be used as a heating medium. In particular, it is possible to heat a heat exchanger with polluted or corrosive media, for example with steam that is polluted by corrosive substances in its contents, for example residues from the pulp dryer.

According to another feature of the invention, the condensates from the heat exchangers can be taken out of the heat exchangers through separate pipes, so that it is also possible to separate corrosive and non-corrosive media in this way. If the heat exchanger is heated with corrosive steam, it is possible to make the heat exchanger out of different materials. A heat exchanger heated with corrosive medium is then made of corrosive-resistant material.

One preferred form of embodiment of the invention proposes driving the first heat exchanger with exhaust steam from an evaporator for pulp and the second exchanger with turbine steam from a power plant, for example.

The drawings show one example of embodiment of the evaporator in the invention schematically.

Fig. 1 shows a longitudinal section through the heat exchanger.

Fig. 2 shows a cross section along line II-II in Fig. 1, and

Fig. 3 shows another longitudinal section along line III-III in Fig. 1.

The evaporator is composed of a cylindrical housing 1, which has an outlet 2 for exhaust steam on the top and an outlet 3 for medium being concentrated on the bottom. Heat

exchangers 4 and 5, which are made out of plate elements that have a cross stream flowing through them, are inside the housing 1, leaving a round space free on all sides.

The medium being concentrated goes through a side intake support 6 in a medium feed 7 arranged in the housing 1 that has suitable distribution sheets and makes sure that it is loaded evenly in the heat exchanger 4 under it. The medium being concentrated flows through the vertical channels of heat exchanger 4 and heat exchanger 5 and comes into an exhaust steam space 8 which takes up the whole cross section of the housing 1 under heat exchanger 5. In this exhaust steam space 8, the exhaust steam is separated from the medium being concentrated, which goes into outlet 3 by gravity, from which it is drawn off out of the housing 1. This is shown by arrow M at the intake support 6 and at the outlet 3.

The exhaust vapors rise up through two lateral steam channels 9 in the housing 1 and are drawn off through the exhaust steam outlet 2. The exhaust steam channels are formed by the space between the housing 1 and the heat exchangers 4 and 5, and are separated from the adjacent part of the inside of the housing by dividing sheet 10. Their position can be seen in particular in Fig. 2.

Due to a lateral steam support 11, for example, steam D coming from a pulp dryer is fed to a steam space 12, which is formed between the wall of the housing 1 and the horizontal intake channels of the heat exchanger 4 in Fig. 1. This steam D1 flows through roughly two thirds of the horizontal channels of heat exchanger 4 and goes into turning chamber 13, in which it circulates and enters the remaining horizontal channels of heat exchanger 4. The steam D1 is condensed in these remaining channels of heat exchanger 4. The condensate K1 is drawn off through the condensate support 14. There is a condensate space 15 under the steam space 12 that is separated from the steam space 12 by a dividing wall 16.

In the same way, heat exchanger 5 is heated with steam D2, which is turbine steam for example, by a lateral steam support 17. This steam D2 goes into a steam space 18, which

like steam space 12, is formed by the outer wall of housing 1; the walls of heat exchanger 5 contain the horizontal channels and the dividing walls 10. Compared to steam space 12, steam space 18 is separated by a dividing wall 19 common to both steam spaces 12 and 18 that also separates the turning chamber 13 and a turning chamber 20 of heat exchanger 5 on the opposite side.

Steam D2 from the horizontal channels on top of heat exchanger 6 goes through this turning chamber 20 into the rest of the horizontal channels, in which the steam D2 condenses. The condensate K2 is drawn off out of the condensate space 22 formed under the steam space 18 by a dividing wall 21 by means of a condensate support 23. This type of condensate support 23 can also be arranged on the opposite side at the turning chamber 20.

Since the dividing wall 19 is also placed on top dividing walls 24 and bottom dividing walls 25 in the area of steam spaces 12 and 18 and turning chambers 13 and 20, there is complete separation between steam D1 and steam D2, so heat exchangers 4 and 5 can be heated independently of one another.

List of Reference Numbers

	1	Housing
	2	Exhaust steam outlet
	3	Outlet
5	4	Heat exchanger
	5	Heat exchanger
	6	Intake support
	7	Medium loading
	8	Exhaust steam space
10	9	Exhaust steam channel
	10	Dividing wall
	11	Steam support
	12	Steam space
	13	Turning chamber
15	14	Condensate support
	15	Condensate space
	16	Dividing wall
	17	Steam support
	18	Steam space
20	19	Dividing wall
	20	Turning chamber
	21	Dividing wall
	22	Condensate space
	23	Condensate support
25	24	Top dividing wall
	25	Bottom dividing wall
	M	Medium
	D1	Steam
	D2	Steam
30	K1	Condensate
	K2	Condensate

Patent Claims

1. An evaporator, especially for the sugar industry, with at least two heat exchangers (4, 5), into the top of which the medium (M) to be concentrated is loaded and which are heated with steam (D1, D2) with different compositions and different pressures in a cross stream, wherein the concentrated medium and the exhaust steam generated after coming out of the heat exchangers (4,5) are carried off separately,
characterized by the fact that
the medium being concentrated (M) is loaded by a medium distribution (7) common to all heat exchangers (4,5) and by the fact that the medium (M) leaving heat exchanger (4) goes directly into the next heat exchanger (5),
by the fact that only after the medium (M) comes out of the second heat exchanger (5) are the exhaust steam and the medium (M) separated
and by the fact that the steam spaces (12, 18) in the heat exchangers (4, 5) separated from the exhaust steam space (8) are separated from one another by a common dividing wall (19).
2. The evaporator in Claim 1, characterized by the fact that the condensate from the heat exchangers (4, 5) is carried away in separate pipes.
3. The evaporator in Claim 1 or 2, characterized by the fact that the heat exchangers (4, 5) are made of different materials.
4. The evaporator in Claims 1 to 3, characterized by the fact that the first heat exchanger (4) is heated with exhaust steam from a steam dryer for pulp and the second heat exchanger (5) with turbine steam from a power plant, for example.

Abstract

The invention concerns an evaporator, especially for the sugar industry, with at least two heat exchangers (4, 5), into the top of which the medium (M) to be concentrated is loaded and which are heated with steam (D1, D2) with different compositions and/or different pressures in a cross stream, wherein the concentrated medium and the exhaust steam generated, after they come out of the heat exchanger (4, 5), are carried off separately. To produce an evaporator that is simple and inexpensive in design, the invention proposes that the medium (M) to be concentrated be loaded by a medium distribution (7) common to all heat exchangers (4, 5) and the medium leaving the first heat exchanger (4) go directly into the next heat exchanger (5). Only after the medium comes out of the second heat exchanger (5) are the exhaust steam and the medium separated. The steam spaces (12, 18) in the heat exchanger (4, 5) separated from the exhaust steam space (8) are separated from one another by a common dividing wall (19).

Fig.1

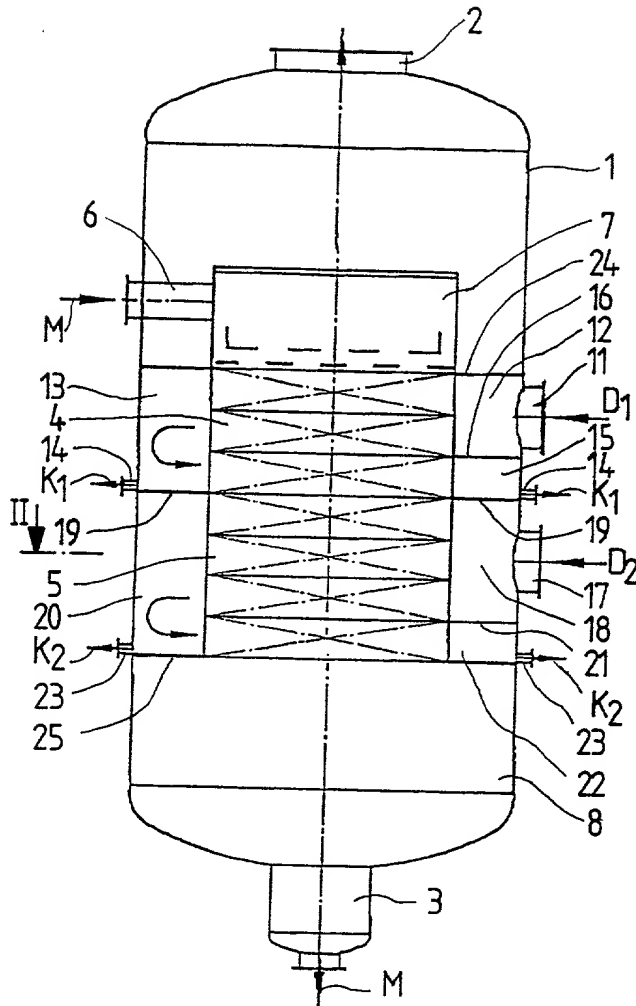


Fig. 3

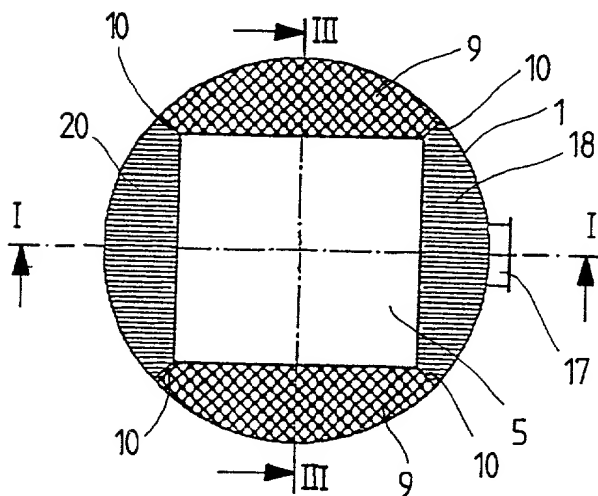
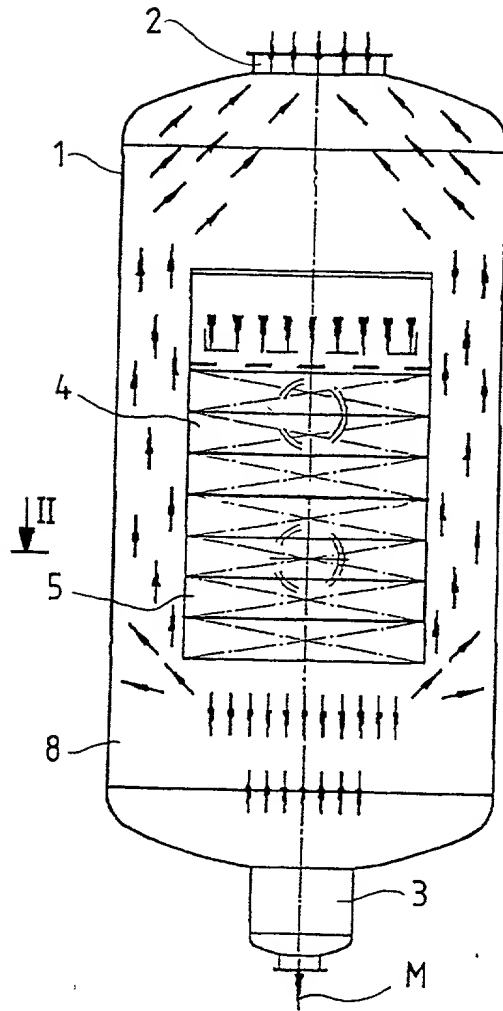


Fig.2